

Exponent rules

The rules students must know in this lesson are:

- Definitions 1 and 2
- Combining 1, 2 and 3
- Distributing 1

Definitions

1. $a^n = a \cdot a \cdot a \cdots a$ (n times)
2. $a^0 = 1$ ($a \neq 0$)
3. $a^{-n} = \frac{1}{a^n}$ ($a \neq 0$)
4. $a^{m/n} = \sqrt[n]{a^m}$ or $(\sqrt[n]{a})^m$ ($a \geq 0, m \geq 0, n > 0$)

Combining

1. multiplication: $a^x a^y = a^{x+y}$
2. division: $\frac{a^x}{a^y} = a^{x-y}$ ($a \neq 0$)
3. powers: $(a^x)^y = a^{xy}$

Distributing ($a \geq 0, b \geq 0$)

1. $(ab)^x = a^x b^x$
2. $\left(\frac{a}{b}\right)^x = \frac{a^x}{b^x}$ ($b \neq 0$)

Careful!!

1. $(a + b)^n \neq a^n + b^n$
2. $(a - b)^n \neq a^n - b^n$

Information from http://www.mathwords.com/e/exponent_rules.htm